National Institute of Environmental Health Sciences

Assessing the impact of climate change on extreme fire weather events over south-eastern Australia

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Abstract:

Extreme fire weather events in southeastern Australia are frequently associated with strong cold fronts moving through the area. A recent study has shown that the 850 hPa temperature and the magnitude of its gradient over a small region of southeastern Australia provide a simple means of discriminating the most extreme cold frontal events during the last 40 yr from reanalysis data sets. Applying this technique to 10 general circulation models (GCMs) from the Coupled Model Intercomparison Project and calibrating the temperature gradient and temperature climatology of each model's simulation of the climate of the 20th century against the reanalysis climates allows estimates of likely changes in frequency of this type of extreme cold front in the middle and end of the 21st century. Applying this analysis to the output of 10 GCM simulations of the 21st century, using low and high greenhouse gas emissions scenarios, suggests that the frequency of such events will increase from around 1 event every 2 yr during the late 20th century to around 1 event per year in the middle of the 21st century and 1 to 2 events per year by the end of the 21st century; however, there is a great degree of variation between models. In addition to a greater overall increase under the high emissions scenario, the rate at which the increase occurs amplifies during the second half of the century, whereas under the low emissions scenario the number of extreme cases stabilizes, although still at a higher rate than that experienced in the late 20th century.

Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2, SRES B1

Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Temperature

Extreme Weather Event: Wildfires

Temperature: Extreme Cold

Geographic Feature: ☑

resource focuses on specific type of geography

☐ None or Unspecified

Geographic Location: ☑

resource focuses on specific location

☐ Non-United States

Non-United States: Australasia

Health Impact: ☑

specification of health effect or disease related to climate change exposure

☐ Health Outcome Unspecified

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

☐ Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

☐ Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

☐ Research Article

Timescale: ☑

time period studied

☐ Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

☐ A focus of content